

DENTAL RESTORATIVE KIT AND METHOD OF RESTORING TOOTH STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is directed to a dental restorative kit for restoring tooth structure. This invention is also directed to a method of restoring tooth structure without prior drilling preparation thereof.

2. Description of the Prior Art

In the past the restoring of non-carious lesions of the cervical region of teeth required normal cavity preparation to provide retention angles before the placement of the restoration. This procedure made it necessary to remove additional tooth structure at the risk of further weakening the tooth. At present this is the accepted procedure for the restoration of these lesions. Sometimes, this cavity preparation is unnecessary such as where detective but otherwise non-carious enamel is to be restored or where exposed cementum is to be protected. In the latter case, a cavity preparation might cause severe sensitivity or irritation of the pulpal areas.

The instant invention overcome the above mentioned disadvantages of the prior art because the composite adheres to tooth structure without first preparing a cavity.

Prior art dental restoring compositions have been reported in the following United States patents:

3,066,112	3,815,239
3,452,437	3,925,895
3,539,533	3,926,906
3,751,399	3,931,678
3,792,531	

SUMMARY OF THE INVENTION

A. A dental restoration kit comprising:

- (a) a particulate solid system of
 - (i) 95 to 105 of a fine, silane treated glass,
 - (ii) 0.1 to 2 parts of fine silica,
 - (iii) 0.5 to 2.5 parts of benzoyl peroxide, and
 - (iv) traces of iron oxide pigment as needed for matching the color of tooth structure.
- (b) a liquid binder system of:
 - (i) 45 to 65 parts of bisphenol-A/glycidyl methacrylate prepolymer,
 - (ii) 5 to 25 parts of hydroxyethyl methacrylate
 - (iii) 15 to 45 parts of ethyleneglycol dimethacrylate,
 - (iv) 0.001 to 3 parts of methacrylic acid,
 - (v) 0.03 to 0.2 parts of p-methoxyphenol, and
 - (vi) 0.05 to 1 parts of N,N-dihydroxyethyl-p-toluidine;
- (c) an etching solution of 25 to 50 percent of phosphoric acid; and
- (d) a primer solution of 2 percent N-phenyl glycine/glycidyl methacrylate condensation product in ethanol

B. A method of restoring a non-carious erosion lesion of the cervical region of a tooth comprising

- (a) conditioning the surface of the tooth with a 25 to 50 percent solution of phosphoric acid, rinsing and drying the tooth;
- (b) applying a primer solution of 2 percent N-phenyl glycine/glycidyl methacrylate condensation

product in ethanol to the tooth to obtain retention to dentin or cementum areas of the tooth;

(c) filling said lesion with a freshly mixed dental filling composition of

- (1) a particulate solid system of
 - (i) 95 to 105 parts of a fine silane treated glass
 - (ii) 0.1 to 2 parts of fine silica,
 - (iii) 0.5 to 2.5 parts of benzoyl peroxide, and
 - (iv) traces of iron oxide pigment as, needed for matching color of tooth structure;
- (2) a liquid binder system of
 - (i) 45 to 65 parts of bisphenol-A/glycidyl methacrylate prepolymer,
 - (ii) 5 to 25 parts of hydroxyethyl methacrylate
 - (iii) 15 to 45 parts of ethyleneglycol dimethacrylate,
 - (iv) 0.001 to 3 parts of methacrylic acid
 - (v) 0.03 to 0.2 parts of p-methoxyphenol, and
 - (vi) 0.05 to 1 parts of N,N-dihydroxyethyl-p-toluidine;
- (d) permitting said composition to harden sufficiently on said tooth.
- (e) finishing said composition on said tooth until said composition matches the original tooth contour.

DETAILED DESCRIPTION OF INVENTION

A method has now been discovered of restoring Class V (gum line) type of lesions without first preparing a cavity in the tooth. The method of the instant invention requires an acid etching of the cervical erosion lesion washing the etched area with water, drying, applying the primer (solution N-phenyl glycine/glycidyl methacrylate condensation product in ethanol), and then flowing into place the composite material to restore the missing tooth structure. The intended use of the invention is to restore areas of gingival erosion (especially moderate and deep erosions) to their normal contours and color.

The composite system of the instant invention has many advantages over the prior art:

- (1) The application of the composite system does not require cavity preparation in the tooth structure;
- (2) The composite system is flowable, adheres to tooth structure, provides excellent marginal adaptation, and seals the tooth surface to be restored;
- (3) Although the composition is not recommended for biting surfaces, it has a sufficiently high compressive strength to withstand oral stresses;
- (4) The composition coating on the tooth is stable in the oral environment;
- (5) Unused portions of the composite system have excellent shelf stability;
- (6) The composition is non-abrasive to metal mixing spatulas; and
- (7) The composition contains a glass filler to provide a suitable opacity for hiding the background of the area to be restored while providing abrasion resistance; yet, it is easy to polish.

ACID ETCHING

Collected data indicate that 2 mm of dentin exists between the surface of a non-carious lesion of the cervical region of the tooth and the pulp. When the dentin of a tooth is exposed as a result of cervical erosion, changes occur on or in the dentin. Scanning electron micrographs indicate that the eroded surface is irregular and contains many small round elevations. The dentinal